Presentation 14 – Paul Levine

Cancer Patterns in Gulf and Non-Gulf Veterans

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Preliminary analytic results in this slide presentation are provided for update purposes only.

Because these analyses are preliminary in nature , they are subject to change following additional data analyses.

Background

- 1995–AIDS-Cancer Matching Program successfully uses an Automatch program to match files from AIDS and Cancer registries to document previously undetected cancers associated with AIDS while preserving patient confidentiality…Cote et al. Prev. Med. 1995; 24: 375-7.
- 1996–Presidential Advisory Committee on Gulf War Veterans' Illnesses recommends long-term studies to investigate cancer rates.
- The North American Association of Central Cancer Registries begins to establish standard procedures for cancer registration in all 50 states and the District of Columbia

Methods

- Files obtained from the Defense Manpower Data Center provided a file with 621,902 veterans arriving in the Persian Gulf between 8/2/90 and 3/1/91 and 746,248 non-Gulf veteran controls.
- Database included names, demographic data, and military service information.

Pilot Study

- Automatch used by New Jersey, a participant in the AIDS-Cancer Matching Program, to match records of New Jersey cancer cases 1991-1999. 135 matches.
- SAS used for match with DC and 323 matches for the years 1991-1999.
- Testicular cancer significantly associated with deployment to the Persian Gulf. Increase apparent 2-3 years after deployment and peaked 4-5 years later.
- Brain cancer and non-Hodgkin's lymphoma had a suggestive association

Levine et al. Military Medicine 2005;170(2):149-153

Follow-up Study

- Three year project supported by ASPH/CDC allowed matching with 6 additional states: California, Florida, Maryland, New York, Illinois, and Texas providing additional matches, 2054 in Gulf and 3383 in non-Gulf veterans.

Demographics

- ~70% of both groups were white and 18% were black
- 86% of the Gulf deployed were males and 79% of the non-Gulf deployed were males
- ~50% of both groups were Army
- Average age in 1991 +/- SD
  - Gulf : 34.3 +/-9.8
  - Non-Gulf : 38.2 +/-10.3
- Average age at diagnosis +/- SD
  - Gulf : 40.6 +/-10.5
  - Non-Gulf : 44.32 +/-10.9
- Active Duty Status
  - Gulf : 80 % Active; 14% Reserve; 6% Guard
  - Non-Gulf : 68% Active; 24% Reserve; 9% Guard

Results by State

			# of matches		Crude PIR (95%CI)		
State	Population (millions)	Veteran Population (millions)	Gulf	Non-Gulf	Testicular	Brain	NHL
California	33.9	2.6	481	769	1.2 (0.97-1.5)	1.3 (0.93-1.8)	0.8 (0.6-1.2)
Texas	20.9	1.8	637	965	1.3 (1.1-1.6)	1.1 (0.9-1.5)	1.1 (0.9-1.4)
New York	18.9	1.4	213	425	0.9 (0.6-1.4)	1.3 (0.6-2.7)	1.5 (0.7-3.1)
Florida	15.9	1.9	485	839	0.9 (0.6-1.4)	2.0 (1.1-3.5)	1.3 (0.8-2.1)
Illinois	12.4	1.0	184	304	0.8 (0.5-1.3)	0.9 (0.5-1.7)	1.0 (0.6-1.8)
New Jersey	8.4	0.7	45	91	1.7 (0.4-6.4)	1.0 (0.2-6.4)	0.4 (0.1-1.6)
Maryland	5.3	0.5	54	81	0.99 (0.3-3.9)	0.9 (0.4-2.3)	0.6 (0.2-2.1)
DC	0.6	0.04	108	203	3.8 (1.5-9.6)	1.5 (0.5-4.1)	1.8 (0.7-4.2)

Combined Results

- 2167 matches in Gulf and 3560 matches in non-Gulf*
- Crude PIRs (95% CI)
  - Testicular Cancer: 1.22 (1.01-1.47)
  - Brain Cancer: 1.38 (1.08-1.77)
  - NHL: 1.10 (0.80-1.38)
- **Adjusted PIRs (95% CI)**
  - **Testicular Cancer: 0.9 (0.7-1.1)****
  - **Brain Cancer: 1.1 (0.8-1.5)*****
  - **NHL: 0.9 (0.7-1.1)*****

*Only those with diagnosis after 1991 and overlap with DC and MD removed.
** Adjusted for age, age^2, and race
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Conclusions to Date

- Matching of cancer records with deployment status is feasible and eventually can be performed on a nationwide basis.
- Within particular states, results are suggestive for testicular and brain cancer but thus far no significant differences in combined data.
- Analysis and addition of states are continuing. Interstate differences need to be investigated.

Future Plans (1)

1) Additional matches

Pennsylvania, Ohio, Michigan, Georgia, North Carolina, Massachusetts, Indiana, Washington, Missouri, Wisconsin, Arizona

Population=84.2 million

Estimated Civilian Veteran Population=8.3 million

Est. cases/year=351,000

(States chosen in order of population, all NAACCR gold or silver certification)

Future Plans (2)

2. Investigate reasons for state differences
   Deployment site of reservists
   Background cancer patterns
   Registry methodology
3. Consider another match in 5-10 years to allow for longer latent periods

Key Studies

- Gray GC, Coate BD, Anderson CM, Kang HK et al. The Postwar Hospitalization Experience of U.S. Veterans of the Persian Gulf War *N Engl J Med*. 1996; 335: 1505-1513.
- Garland FC, Gorham ED, Garland CF et al. Testicular cancer in U.S. Navy Personnel. *Am J Epidemiol*. 1988; 127: 411-414.
- Knoke JD, Gray GC, Garland FC. Testicular Cancer and Persian Gulf War Service. *Epidemiology*. 1998; 9: 648-653.
- Bullman TA, Mahan CM, Kang HK, Page WF. Mortality in US Army Gulf War Veterans Exposed to 1991 Khamisiyah Chemical Munitions Destruction. *AJPH*. 2005; 95: 1382-1388.